The Revolution of Wireless 9-1-1 Location Technologies:

Better Location, Delivered Faster

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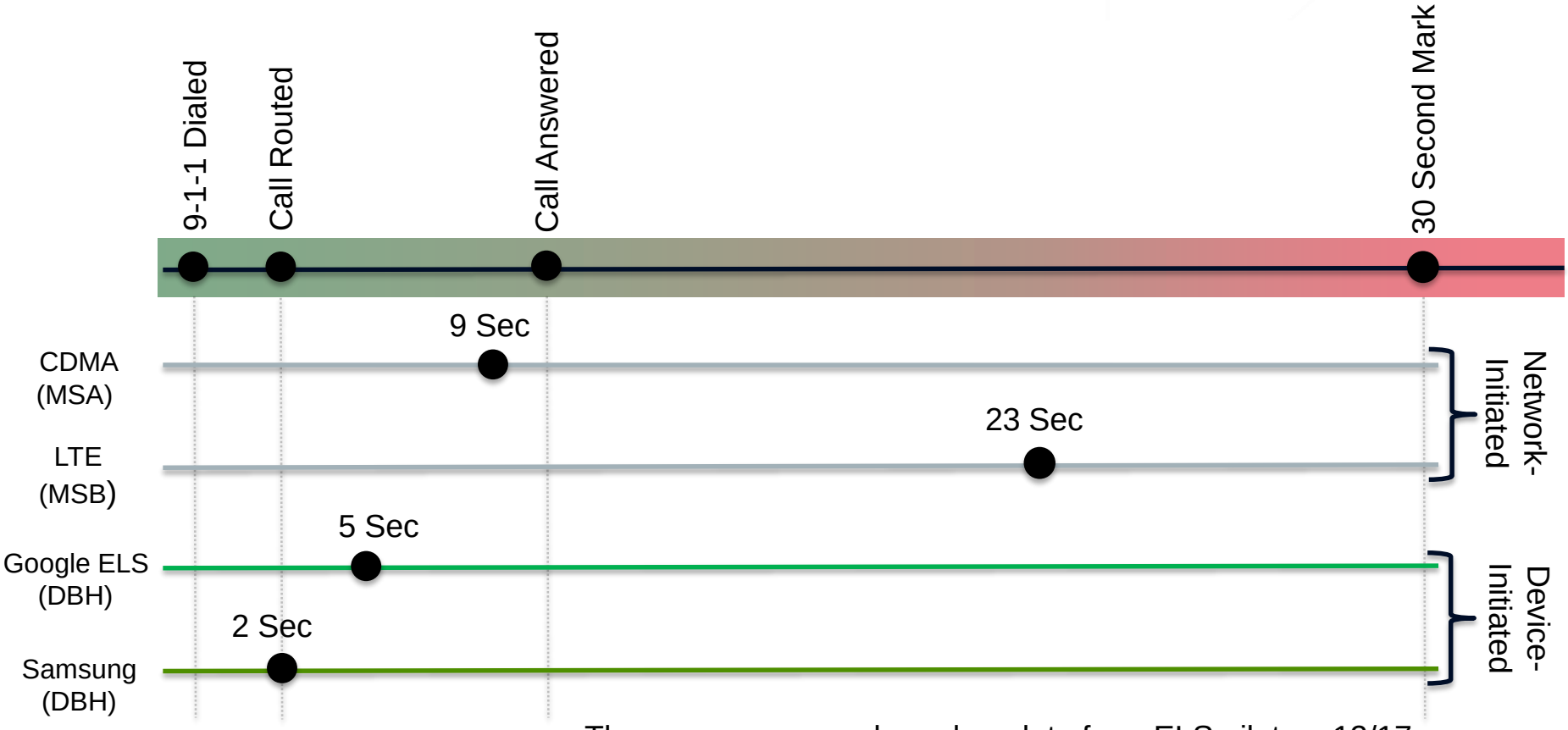
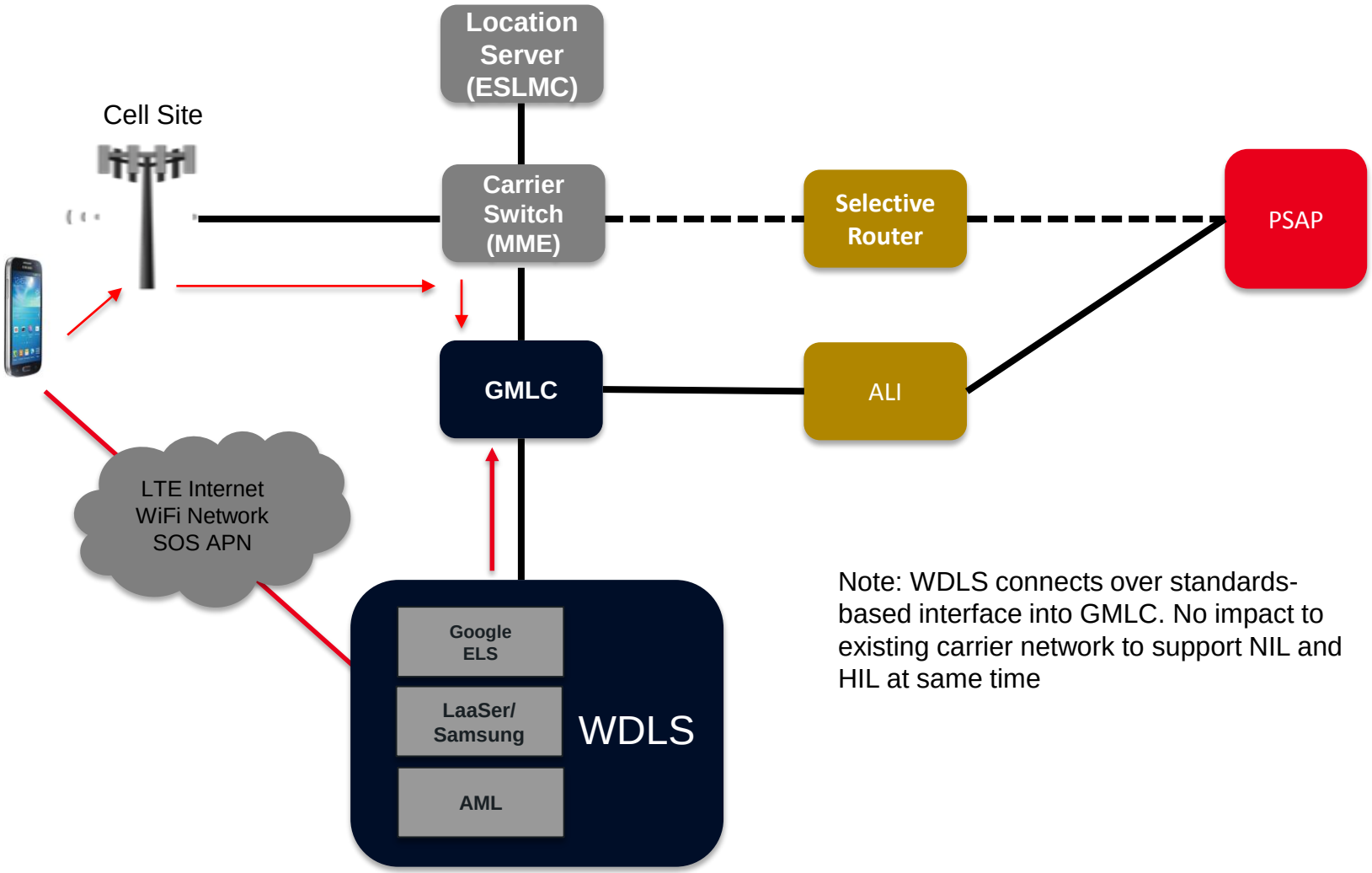
9-1-1 Location Value Timeline



These are averages based on data from ELS pilot on 12/17

Handset Initiated Location

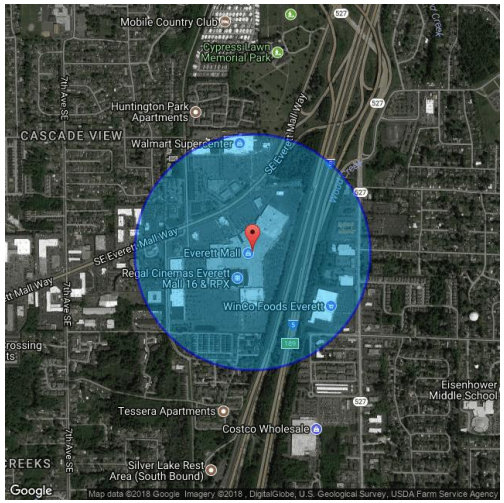


Note: WDLS connects over standards-based interface into GMLC. No impact to existing carrier network to support NIL and HIL at same time

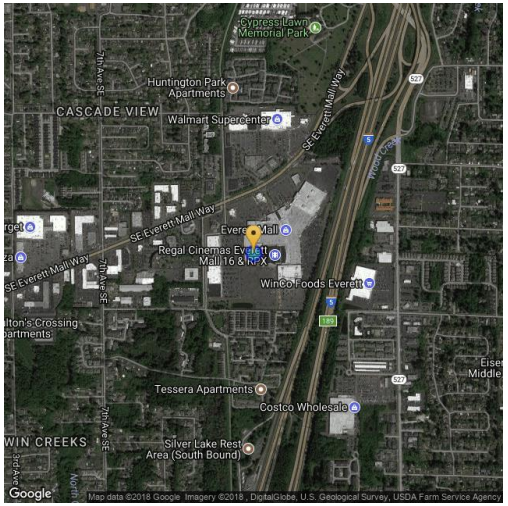
Google ELS Pilot

- December 2017 pilot used Android handsets across multiple carriers in Snohomish County, WA and Palm Beach County, FL.
- Average location uncertainties for GPS were 10-25M; WiFi was 25-50M
- Actual 9-1-1 calls were used to gather real world location technology yields
- Extensive testing was done before the trial
- **No 9-1-1 calls were impacted in any way with the trial**
- Provided an architecture that could **augment the existing 9-1-1 infrastructure**
- Data was post processed to determine how ELS could improve both the **speed and accuracy** of existing wireless 9-1-1 calls to improve emergency outcomes

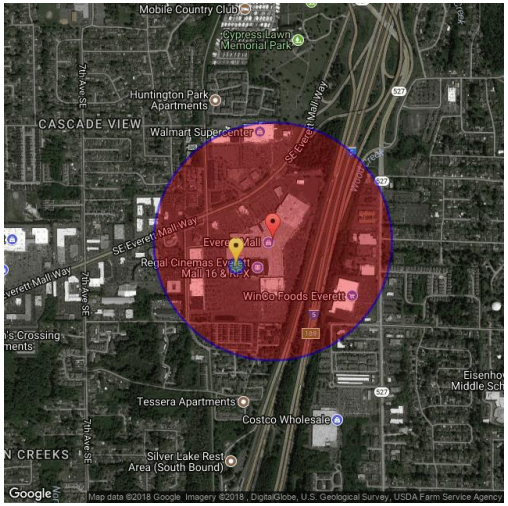
Typical ELS Location Improvement



Carrier
488M



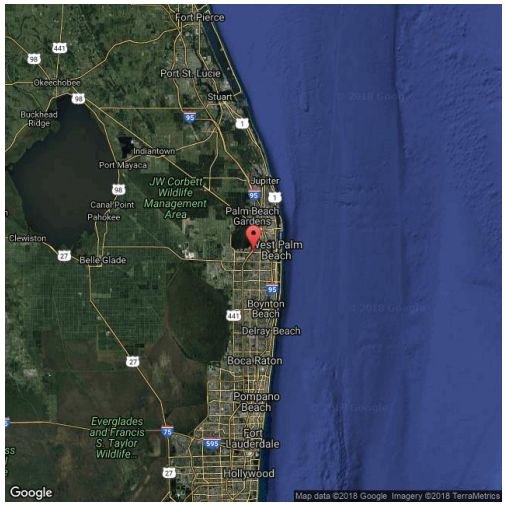
ELS
WiFi 31M



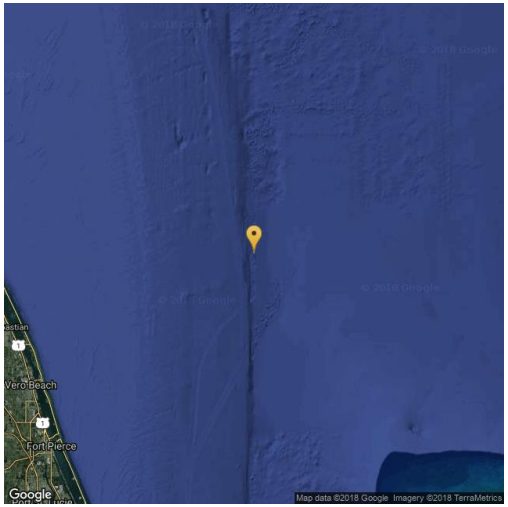
ELS & Carrier

CELL Verification

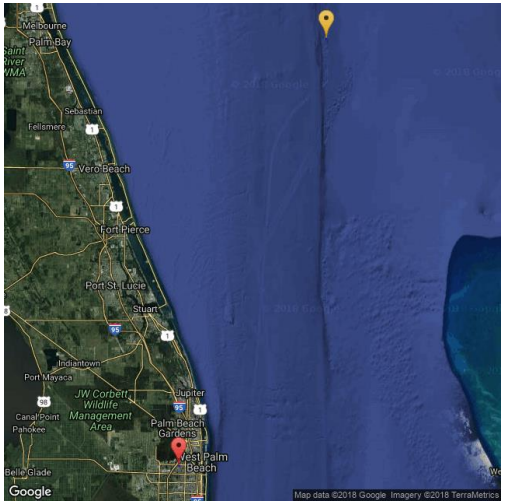
WDLS Location Validation



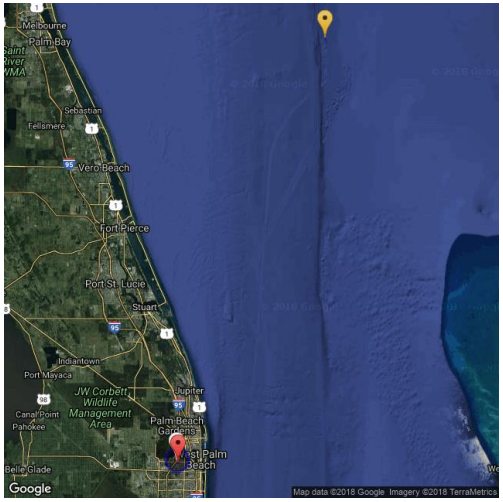
Carrier
AFLT 71M



ELS
WiFi 62M



ELS & Carrier



CELL REJECTION

First PSAP Bid (Call Answered)

Phase 2-capable Location Yield

	Carrier	ELS
GPS	20%	10%
WiFi	0%	48%
Total	20%	58%

Note: Yield is the percentage of time you receive a Phase 2 capable location.

Later PSAP Bids (30 Seconds)

First Reported Phase 2-capable Location

	Carrier			Google ELS		
	Yield	Median Time	Median uncertainty	Yield	Median time	Median uncertainty
AGPS	34%	9 sec	210 m			
GPS	49%	23 sec	15m	14%	4 sec	20 m
WiFi				76%	5 sec	34 m
Total	83%			90%		

Note: For Carriers only GPS and AGPS locations were evaluated. For ELS, only the first reported location was used and subsequent locations may have been more accurate. Uncertainty (Normalized to a confidence of 90%) was used to compare location quality and is not a measure of actual accuracy. All locations normalized to 9-1-1 industry standard confidence of 90%

ELS Location Improvement

Overall Location Improvement Potential

Source	ELS Location Improvement
GPS	7%
WiFi	27%
Total	34%

Note: The uncertainties of the carrier GPS/AGPS and ELS's WiFi and GPS locations were compared.